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WOLF SPIDERS OF THE *PARDOSA MONTICOLA* GROUP (ARANEAE, LYCOSIDAE)

PAOLO TONGIORGI

Among the species of the genus *Pardosa*, those of the *monticola* group are easily distinguished from all the others, but it is difficult to distinguish the different species within the group. Identification of females is often uncertain because of their extreme similarity and great variability. In contrast, under careful examination, the males reveal some distinctive features that allow quick identification. The lack of a revision of the group makes identification still more difficult as the literature is scattered and the different authors have used different taxonomic criteria.

Having large collections available from several European localities, I have tried to fill the need for a revision. The material was partly collected by myself and others, and in part kindly lent by the curators of the museums of Genoa and Florence, Italy, and from the Museum of Comparative Zoology at Harvard University. During my study of various collections, I found fifteen species in the group and several of doubtful taxonomic status. Because of the difficulty of recognizing the species belonging to the *monticola* group on the basis of the original descriptions, undoubtedly some species were missed. Often it was difficult to match males and females; when in doubt I followed earlier authors.

For the different species I listed only references to works that have useful drawings or are of particular interest. For additional references, the bibliographic works of Bonnet (1958) and Roewer (1954) may

be consulted. I based the geographical distributions of the species of the *P. monticola* group on the data furnished by these authors; therefore, I want to emphasize that the given distributions are only tentative. The distribution assigned to many species in the literature seems to be much larger than it actually is because many specimens have been misidentified. Owing to the close resemblance of many species of the *monticola* group, specimens of less well-known species and probably also representatives of new species have been wrongly labeled as species already described. It was found that there are many closely related species in limited, often adjacent, areas.

The drawings of the left male palpus illustrate the ventral and ventrolateral views. In the ventrolateral view the palpus is rotated about 60°, a position that shows the terminal apophysis equally well in all species.

The descriptions and the drawings of the body are based on female specimens because the color pattern may be a useful distinctive character for females. The male is, as a rule, similar, but often darker and less distinct. If the male differs for some other characters it is pointed out. Only the external view of the female genitalia was drawn. Some authors have used the internal genitalia (vulva) as a diagnostic character (Dahl, 1908; Dahl and Dahl, 1927; Kratochvíl, 1935). However, in this group at least, the internal genitalia do not furnish enough

clear differences. When considerable variability occurred, or it was otherwise necessary, I provided more than one drawing, selecting examples, as far as possible, from the same population. Whenever possible, specimens were selected to represent the mean of the specific variability. I made little use of measurements because in my experience they are very similar in the different species. Also the ratios used by some authors are in my opinion of little or no use, because their variability is so large that they overlap completely.

I have followed Holm's terminology (1947) in naming anatomical parts of the male and female genitalia. Septum means the wide sclerotized shield that, in this group, nearly covers the epigynal hollow. The anterior pockets (epigyntvärfficka of Holm or Quertaschen of Järvi, 1905) are the two pockets at the anterior edge of the septum.

The apophyses of the male palpus are two: the tegular apophysis, large and easy to see, is placed about mid-ventrally in the bulb; the terminal apophysis is located on the external side ventrolaterally in the bulb (left side on the left palp and vice versa).

Finally, I wish to stress that the key to identification of females, and the descriptions and drawings, fit the mean of each species. It is possible that a certain specimen can hardly be recognized as belonging to one or the other species; by using numerous specimens, especially of males, one can minimize wrong identifications. In several instances, the specific name is followed by another name in parentheses, e.g. *P. agrestis* (*pseudoagricola* Dahl). I wish to make clear that this does not indicate a subspecies, but only emphasizes a particular aspect of body pattern by reference to a familiar name. Some authors have, indeed, distinguished several subspecies in highly variable species. The validity of such systematic categories is doubtful but the names introduced in the literature are useful to recognize different "forms." Due to the availability of specimens, classification and

relations with the other species are more certain for species of western Europe than for those found in other regions. For species of which I was able to examine only one or few specimens, the distinctive characters I used must be considered tentative.

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KEY TO SPECIES

Some of the species of the *monticola* group have been already described (Tongiorgi, 1966); therefore, I refer to that paper instead of repeating the same figures. In the keys and in the text, "Fig." capitalized, refers to this paper, "fig." in lower case type, to my previous paper. *Pardosa angusta* Denis is included in the key, but not in the text. I was not able to examine this species, which, according to Denis (1956), belongs to the *P. monticola* group.

The species of the *Pardosa monticola* group are distinguished from other species of the *Pardosa* genus mainly by the shape of the genital organs. The males have the tarsal article of the palpus rather stout, generally with a short point. The tegular apophysis is spatulate or finger shaped and apically blunt. The tegulum, on the palpus observed from the side, somewhat projecting. On the females the septum is a trapezoidal plate covering the whole genital depression.

- | | | | |
|---|------------------------|--|----------------------------|
| 1. Males | 2 | 9. Terminal apophysis with two small blunt teeth (Fig. 6) | 10 |
| - Females | 18 | - Terminal apophysis with one tooth only or without teeth | 11 |
| 2. Tarsus, metatarsus, and part of tibia I with more or less long hairs, much longer than on the corresponding segments of other legs | 3 | 10. Tegular apophysis long and tapering (Figs. 6, 7); median light band of carapace pointed in front | <i>P. arenicola</i> |
| - Tarsus, metatarsus and tibia I with hairs as on the other segments of legs | 8 | - Tegular apophysis long but apically blunt (figs. 107, 108); median light band of carapace dilated in front | <i>P. agricola</i> |
| 3. Metatarsi and tibiae I and II evidently thicker than the corresponding segments of other legs, covered with short and thick hairs which make a scopula on ventral side (Fig. 20) | <i>P. ilguenensis</i> | 11. Median light band of carapace dilated in front; lateral bands broken | 12 |
| - Metatarsi and tibiae I and II not thicker than those of other segments. Only on leg I are hairs much longer on metatarsi and tarsi than on the other segments | 4 | - Median light band dilated or pointed; lateral bands continuous | 13 |
| 4. Hairs of the first leg erect | 5 | 12. Terminal apophysis with a pointed, stout tooth (figs. 109, 110) | <i>P. torrentum</i> |
| - Hairs of the first leg appressed | 7 | - Terminal apophysis without tooth (as in <i>P. purbeckensis</i>) (figs. 100, 101) | <i>P. agrestis</i> (part.) |
| 5. Terminal apophysis as in Figures 12, 14, without prominent teeth; only a little crest slightly protruding on the apophysis. Tegular apophysis rather short and apically blunt | 6 | 13. Median light band of carapace dilated; terminal apophysis without tooth (figs. 100, 101) | <i>P. agrestis</i> (part.) |
| - Terminal apophysis without teeth or crest. Tegular apophysis long and apically pointed (Figs. 1, 2) | <i>P. incerta</i> | - Median light band pointed in front | 14 |
| 6. Hairs of the first pair of legs as in Figure 21 | <i>P. purbeckensis</i> | 14. Terminal apophysis without tooth (figs. 100, 101) | <i>P. agrestis</i> |
| - Hairs of the first pair of legs as in Figure 22 | <i>P. plumipes</i> | - Terminal apophysis stout, more or less tooth-shaped | 15 |
| 7. Terminal apophysis stout, beak-like, as in figures 104, 105 | <i>P. mixta</i> | 15. Articles of male palpus without white hairs; terminal apophysis small and slender. Tegular apophysis generally long and rather pointed (figs. 111, 112) | <i>P. monticola</i> |
| - Terminal apophysis a triangular, forwardly-directed tooth (Fig. 8) | <i>P. olympica</i> | - Articles of male palp more or less covered with white hairs | 16 |
| 8. Terminal apophysis large, well developed, more or less pointed and jagged at the apical end (figs. 102, 103) | <i>P. palustris</i> | 16. Femur, patella and tibia of palpus with many white hairs | 17 |
| - Terminal apophysis small, differently conformed | 9 | - Femur and patella only with white hairs (figs. 115, 116) | <i>P. blanda</i> |
| | | 17. Palpal tarsus with white hairs (figs. 117, 118); carapace pattern as in <i>P. blanda</i> (fig. 90) | <i>P. albata</i> |
| | | - Palpal tarsus without white hairs (Figs. 10, 11). Carapace as in <i>P. mixta</i> (fig. 93) | <i>P. pontica</i> |
| | | 18. Median light band of carapace tapering, pointed in front or ending with a small diamond-shaped spot (Fig. 18). If slightly dilated in the cephalic region, the median band is nevertheless always narrow and spindle-shaped in the thoracic region | 19 |
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| | | 19. Lateral bands of carapace broken | 20 |
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- Median band truncate in front and a little enlarged on the thorax *P. angusta*
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- Legs light; femora with dorsal blotches sometimes extending to their undersides. Other legs uniform reddish or yellow-brown or more or less annulated 26
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33. Lateral light bands of carapace broken 34
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37. Epigynum as in figures 84, 85. Lateral light bands very broad, reaching sides of carapace. Posterior sides of abdomen thickly clothed with white hairs *P. palustris* (part.)
- Epigynum as in figures 72–74. Between the sides of carapace and the lateral light

bands is one thin, dark band. Abdomen without white hairs except the usual pattern *P. agrestis*

Pardosa ilguenensis Nosek

Figures 3–5, 20, 29

Pardosa ilguenensis Nosek, 1905: 142–143, pl. 5, figs. 20, 22a, b, ♂ ♀. Two males and one female lectoparatype from Ilgyn, Turkey, in the Naturhistorisches Museum, Vienna, examined. One male lectotype, here designated.

P. ilguenensis,—Roewer, 1954: 164. Bonnet, 1958: 3377.

Description. Female carapace brown. Light median band yellow and spindle-shaped. Lateral bands yellow, wide, continuous, separated from the margins of carapace by a dark band of rather faint brown spots. Legs yellow. Some pale brown rings on upper sides of femora and tibiae.

Male carapace darker than in female. Light median band spindle-shaped. Yellow lateral bands continuous, only a little wider than the median one. Legs yellow; femora with dorsal blotches, other segments uniform.

Tibiae and metatarsi of the first two pairs of legs clearly thicker than the corresponding segments of other legs. These two segments are covered thickly with short hairs that form a scopula ventrally, and contribute to the characteristic appearance of the legs. The ventral spines on the tibiae and metatarsi are very short. The whole body is covered with white pubescence. Male palpus as in Figures 3–5. Femora slightly brown striped, other segments pale yellow. The terminal apophysis, shaped as a triangular tooth, looks conical from the side.

Remarks. The male and female probably belong to the same species, but this is not certain. The male of this species is distinguished by the structure of the palpus and by the characters of the first two pairs of legs. The female, judging by the carapace pattern and the shape of the septum

is closely related to *P. incerta*. The legs show differences in annulation. Having only one female, I cannot make any comparison with the other species. Figure 5 shows the tegular apophysis of the paratype of *P. ilguenensis*. It is slightly different from that of the type.

Distribution. Turkey: Ilgyn.

Pardosa incerta Nosek

Figures 1–2, 26

Pardosa incerta Nosek, 1905: 139–140, pl. 5, figs. 17, 23, ♀. Female holotype from Erdschias-Dag (Erdjies-Dagh) in Asia Minor, in the Naturhistorisches Museum, Vienna, examined.—Roewer, 1954: 164. Bonnet, 1958: 3377.

Lycosa incerta,—Giltay, 1932: 19, fig. 13, ♀.

Note. In a footnote, Nosek (1905, p. 142), mentions some females found in Erdjies area. These females are preserved, in the same vial, with the types of the *Pardosa pentheri* Nosek and among them I found also a male of one *Pardosa* belonging, with the above mentioned females, to the *P. monticola* group. Actually *P. pentheri* belongs to the genus *Alopecosa* and is exactly like *Lycosa cursoria* var. *insignis* described by Nosek on page 138, the type of which I examined. This *Alopecosa* is probably identical to *Tarentula cursor elatior* described by Kratochvil (1935, p. 19, fig. 14, ♀) from Vales, Macedonia. On page 142, concluding the description of *Alopecosa pentheri*, Nosek says that this species must be regarded as very closely related to *Pardosa plumipes* Thorell. While the male of *Alopecosa pentheri* is quite different from that of *P. plumipes*, the male preserved with the females has long hairs on the first pair of legs, just as *P. plumipes* has. It is clear that Nosek confused the two specimens, or at least added to the description of *Alopecosa pentheri* a character that does not exist in this species. I made drawings of this male and the epigynum of one of the females that seem to me to be identical with *P. incerta*; it is nevertheless yet to be confirmed that this male really matches the

female of *P. incerta*. As Nosek's drawings are sufficient, I did not make drawings of the type specimen of *P. incerta*.

Description. Carapace dark brown. Median and lateral bands yellow, covered with white pubescence. Median band spindle-shaped, anteriorly very sharp; lateral bands continuous, as wide as median, separated from margins of carapace by a dark band. The carapace pattern is similar to that of *P. monticola* (fig. 94). Legs yellow-brown. All segments clearly annulated. Abdomen yellow-brown with very pale pattern. Epigynum as in Figure 26.

The male is similar to the female, but darker. Legs: femora with dorsal annulations, more or less uniformly darkened ventrally. Tibiae with annulations. Metatarsi probably annulated but as a result of the prolonged stay in alcohol it is difficult to judge. Metatarsi of the first legs with long hairs as in *P. purbeckensis*; tarsi and tibiae also with long hairs. The hairs have broken off in several places so that it is impossible to see their arrangement on these segments. The male palpus as in Figures 1, 2; apically the tegular apophysis leans entirely against the part of the bulb below it (shield; see Tongiorgi, 1966, Fig. 1). As the left palpus is missing, I could not see whether this character appears in both palpi. The terminal apophysis is a little tubercle, and very difficult to see. Distally the femora and patellae of the male palpi are covered with white hairs.

Remarks. *Pardosa incerta* is closely related to *P. purbeckensis*. The male can be distinguished by the different shape of the tegular apophysis. The terminal apophysis of *P. purbeckensis* carries a prominent little crest that, observed from the ventral or lateral side, looks as in Figures 14, 15. This crest is absent in *P. incerta* (Figs. 1, 2). The annulations on the femora, reaching to the ventral side, distinguish the female of *P. incerta* from that of *P. purbeckensis*. In this character *P. incerta* is similar to *P. agrestis*. It is possible to distinguish females of *P. incerta* from those of *P. ilguenensis* by the

annulation of the legs. Some specimens of *P. agrestis*, in the Museum of Comparative Zoology, collected in Hungary near Deliblat by Reimoser, have an epigynal septum identical to that of *P. incerta* but have the carapace pattern of the typical form of *P. agrestis*.

Distribution. *Asia Minor:* Erdsehias-Dag 1 ♀; Erdschias area 7 ♀♀, 1 ♂ (Penther-Zederbauer) (Nosek Coll., NMW); Tachtoli-Dag, 440 m (Giltay, not examined).

Pardosa purbeckensis F.P.-Cambridge
Figures 14–15, 21, 25

Pardosa purbeckensis F.P.-Cambridge, 1895: 32–34, pl. 4, figs. 1, 4, 7a, 8a, 9, ♂♀. Male and female syntypes from Poole Harbour, England, probably in the British Museum, London.—Roewer, 1954: 172. Bonnet, 1958: 3416.

Lycosa purbeckensis.—Smith, 1907: 18, pl. 1, figs. 5a, b; pl. 4, fig. B, ♂♀. Locket and Millidge, 1951, p. 258, figs. 123 D, 126 A, B, 127 D, ♂♀. Kniille, 1954, pl. 22, figs. 4a, 5, ♂.

Description. Carapace dark brown. Median light band sometimes attenuated anteriorly, sometimes slightly enlarged as an arrow point behind the posterior eyes. Lateral bands as broad as the median one, extending to clypeus (not always in the males). (For the drawings of carapace pattern see *P. monticola*.) Legs yellow-brown. Dorsal sides of the femora with dark longitudinal spots that never extend to ventral sides. The other segments evenly brownish or with faint patches on the metatarsi that may become annulations on metatarsi III and IV. Male tarsus, metatarsus and part of tibia I with long, rigid, straight hairs (Fig. 21). Terminal apophysis of male palpus without any projecting tooth. The dark sclerotized pieces of the terminal apophysis arranged as in Figures 14, 15. Epigynum as in Figure 25 with the sides of the septum slightly sinuous.

Remarks. The different structure of the terminal apophysis distinguishes the males of *P. purbeckensis*, *P. mixta* and *P. olympica*. In *P. mixta* and *P. olympica*, the long hairs

covering the first three segments of leg I are longer, more numerous, and are directed forward rather than straight out (compare Fig. 23). It is possible to separate the males of *P. purbeckensis* from those of *P. agrestis*, which has a very similar palp, by the absence of long hairs on the first leg of *P. agrestis*. The different shape of the tegular and terminal apophysis distinguishes *P. purbeckensis* from *P. incerta*, which has a similar arrangement of hairs on the first legs. Hairs are clearly different in *P. plumipes*. The females can be mistaken for those of *P. monticola*, *P. arenicola* (*fucicola* Dahl) and *P. agrestis* (*pseudomonticola* Simon). From *P. monticola*, *P. purbeckensis* is distinguished by the shape of the epigynum, usually featuring a well-marked longitudinal groove extending for about two-thirds of the septum. In contrast, in *P. monticola* the groove is indistinct and very often limited to the anterior half. Also the edges of the anterior pockets are never so divided as in *P. monticola*. *Pardosa purbeckensis* is distinguished from *P. arenicola* by the less sinuous lateral sides of the septum; from *P. agrestis* and *P. incerta* by its much less clearly annulated legs and by differences in annulations of femora. But these characters are so unreliable that very often, as Knülle (1954, p. 72) says: "Die Weibchen von *L. agrestis* und *L. purbeckensis* sind nicht trennbar."

Ecology. Salt marshes seem to be the typical habitat (Knülle, 1954), but it is possible to find *P. purbeckensis* on mud flats near seashores.

Distribution. Great Britain, Denmark, Germany, Netherlands.

Specimens examined came from Germany and England. Illustrations were made from German specimens (Knülle det.).

Pardosa plumipes (Thorell)

Figures 12–13, 22, 32

Lycosa plumipes Thorell, 1875a: 104. Male holotype from Orenburg, southern Russia, in the Natural History Museum, Stockholm, examined;

1875b: 143–144.—Odenwall, 1901: 257–258, figs. 1–4, ♂ ♀. Strand, 1909: 76–78. [Not *Pardosa plumipes* Mello-Leitão, 1942: 395 (= *Pardosa plumipedata* Roewer).]

Lycosa monticola,—Saito, 1934: 358–359, pl. 15, fig. 87, ♀. Saito, 1959: 53, pl. 5, fig. 302, pl. 6, fig. 306, ♀.

Pardosa plumipes,—Roewer, 1954: 170. Bonnet, 1958: 3407.

Description. Carapace brown. Light median band yellow, narrow, spindle-shaped, tapering anteriorly. Lateral bands yellow, wide. Each lateral band includes, near the margins of carapace, a dark band somewhat as in *P. palustris* (Fig. 16), and much clearer on the female than on the male. Clypeus yellow. The female has yellowish, annulated legs. Metatarsi of fourth pair darker, the annulations tending to merge. Male with light legs. Tibiae and metatarsi of the first pair with long hairs as in Figure 22. (The specimen in poor condition and the tarsi are lost.) The male palpus, as in Figures 12, 13, is similar to that of *P. purbeckensis*; the epigynum is illustrated by Figure 32.

Remarks. The males of *P. plumipes* can be separated from males of *P. purbeckensis* by the different arrangement of hairs on the first pair of legs. *Pardosa incerta* has a longer and sharper tegular apophysis than has *P. plumipes*. There are also small differences in the terminal apophysis. *Pardosa plumipes* can be separated from *P. mixta* and *P. olympica* by the arrangement of hairs on the first legs. Females differ from those of *P. purbeckensis* in having lateral bands on the carapace much broader and enclosing a dark one. *Pardosa purbeckensis*, in contrast, has the dark lateral bands marginal. The posterior angles of the genital plate of *P. plumipes* project laterally more than in *P. incerta*. Having examined only two females, I cannot make comparisons with the other species.

The two female specimens I examined from Japan were determined by Strand (1909). The carapace pattern agrees very well with that of the male holotype of *P.*

plumipes. The shape of the epigynum agrees with the drawing and description of Odenwall (1901). Unfortunately, the numerous specimens of both sexes studied by Odenwall are lost. *Pardosa monticola*, illustrated by Saito (1934, 1959), must, I think, be regarded as *P. plumipes* (see above); it is certainly not *P. monticola*.

Distribution. Russia: Siberia. Japan: Nemura-Yesso (Strand, 1909); Akkeshi (Saito, 1934, 1959).

Specimens examined came from Orenburg, southern Russia and Nemura-Yesso, Japan.

Pardosa mixta (Kulczynski)

Figure 23

Lycosa mixta Kulczynski, 1887: 299–302, pl. 5, figs. 11, 12, ♂ ♀. Syntypes from Schlern Berg, southern Tyrol, [M. Sciliar, Trentino-Alto-Adige], probably in the Budapest Museum. Kulczynski, 1909: 441–444, pl. 22, fig. 15. ♂. Kratochvil, 1935: 14–16, figs. 2–4, 10, ♂ ♀.

Pardosa mixta,—Roewer, 1954: 167. Bonnet, 1958: 3388. Tongiorgi, 1965: figs. 80–81, 93, 104–105, ♀ ♂.

Description. Carapace brown. Median band pointed in front, in the male often faint anteriorly. Lateral bands continuous, about as broad as the median one, separated from the carapace margins by a narrow dark band, then by another thin light band (fig. 93). In the female the lateral bands extend to the clypeus; in the male the sides of the head are darkened. Legs yellow-brown. Femora with dorsal longitudinal dark marks; the other segments with indistinct rings, clearer on posterior legs. Tarsus, metatarsus, and part of tibia of male with very long lateral and forwardly directed hairs (Fig. 23). Abdomen brown-red. Male palpus with terminal apophysis as in figures 104, 105. Epigynum as in figures 80, 81. Septum a little broader than long. Posterior angles more or less blunt, wrinkled, and sometimes prominent.

Remarks. The male can be mistaken only for *P. olympica* because of the long hairs

on the first three segments of the first pair of legs, but it is distinguished by the terminal apophysis. *Pardosa mixta* can be distinguished from *P. purbeckensis*, *P. plumipes*, and *P. incerta* by a different arrangement of hair on the legs and by the different shape of the terminal apophysis (see Figs. 21, 22). The females are distinct from *P. blanda* (and *albata*?) and *P. palustris* by the shape of the edge of the anterior pockets. The females of *P. mixta*, *P. agricola*, and *P. torrentum* differ by the carapace pattern; *P. mixta* differs from *P. monticola* by having the septum broader than long (in *P. monticola* it is longer than broad or as long as broad). Habitat and differences in genital plate distinguish this species from *P. arenicola* and *P. purbeckensis*. The lateral light bands are generally a little broader than the median bands in *P. agrestis* (*pseudomonticola* Simon) while they are about equal in *P. mixta*. *Pardosa mixta* and *P. olympica* have different septa.

Ecology. *P. mixta* lives on the mountains. In the Alps it seems to prefer altitudes of 2000–2500 m.

Distribution. Switzerland, Italy, Tyrol, Carpathians, Yugoslavia.

Specimens examined came from Switzerland, Italy, and Tyrol. Illustrations were made from Swiss and Italian specimens.

Pardosa olympica n. sp.

Figures 8–9, 17, 30

Type. Male holotype from Attika Moni Pentelli [Mone Pendéli east of Athens], Greece, May 1926 (C. F. Roewer), in the Senckenberg Museum, Frankfurt.

Description. Female. Total length 5.0 mm. Carapace 2.5 mm long, 1.95 mm wide. Carapace brown. Median light band spindle-shaped, reddish yellow; there is a transverse enlargement just behind the posterior eyes as in Figure 17. Lateral bands reddish, narrow, continuous; separated from carapace margins by a dark streak and then by a light, scantily marked one; carapace also with a black marginal line. Clypeus

yellow. Chelicera reddish yellow, a little darkened at the apex. Sternum black, brighter in the middle. Abdomen blackish with the usual reddish pattern of the species of the group. Legs yellow with brown rings. Femora with dorsal rings, almost uniformly brownish color. Metatarsi more or less annulated but with a wide distal ring that sometimes reaches the middle of the segment. Epigynum as in Figure 30. Male. Carapace pattern as in the female. Median light band narrow and tapering anteriorly. Legs yellow. Femora dorsally blotched and slightly darkened ventrally. The other segments are uniform in color. Tarsi, metatarsi, and tibiae of first pair have long white hairs appressed against the segments and directed distally, almost as in *P. mixta* (Fig. 23). The femur of the male palpus is yellow and slightly darkened, patella and tibia are yellow, tarsus is brown. Leg measurements in mm. Female: Femur I, 2.0; II, 2.0; III, 1.9; IV, 2.5. Patella and tibia I, 2.4; II, 2.2; III, 2.2; IV, 3.4. Metatarsus I, 1.5; II, 1.6; III, 2.0; IV, 3.3. Total length leg I, 7.0; II, 6.8; III, 7.0; IV, 10.5. Male: Femur I, 1.8; II, 1.7; III, 1.6; IV, 2.1. Patella and tibia I, 2.3; II, 2.0; III, 2.0; IV, 2.7. Metatarsus I, 1.5; II, 1.5; III, 1.6; IV, 2.7. Total length leg I, 6.6; II, 6.2; III, 6.2; IV, 8.9.

Remarks. *Pardosa olympica* is closely related to *P. mixta* as shown by the carapace pattern and the structure of the genitalia of the male. The *P. olympica* male differs from *P. mixta* in the structure of the terminal apophysis and the more closely appressed hairs of the first legs. The female differs in the shape of the septum. The posterior angles of the septum are as in *P. mixta* but much more blunt and the edges of the anterior pockets are much more medially bent (Fig. 30).

Considering the similarities of the taxonomic characters among different species of the group it appears that the specimens represent a distinct species rather than a subspecies of *P. mixta*.

Distribution. Greece. Attika: Moni Pentelli

(Roewer), 1 ♂ holotype (SMF, R II/3928), 2 ♀ paratypes (SMF, R II/14014). *Crete:* plains near Akrotiri Khersónisos (Roewer), 1 ♂ paratype (SMF, R II/3933), May 1926.

Pardosa palustris (Linnaeus)

Figure 16

Aranea palustris Linnaeus, 1758: 623. Type from Sweden, presumably lost.

Lycosa palustris,—Kulczynski, 1887, pl. 5, figs. 9, 10, ♂. Chyzer and Kulczynski, 1891, pl. 2, fig. 13, ♀. Smith, 1907, pl. 2, figs. 6a, b, 7a, b, pl. 4, figs. C, D, E, ♂ ♀.

Lycosa herbigrada,—Holm, 1947, fig. 12b, pl. 5, figs. 52, 53, pl. 10, fig. 28, ♂ ♀. Knülle, 1954, pl. 22, fig. 1, ♂.

Lycosa tarsalis,—Kulczynski, 1909, pl. 22, fig. 9, ♂. Dahl and Dahl, 1927: 47–48, figs. 124–126, ♂ ♀. Kratochvil, 1935: 17, fig. 5, ♂. Palmgren, 1939, figs. 56, 69, 84, ♂ ♀. Locket and Millidge, 1951: 259–261, figs. 123 E, F, 124 D, 126 C, D, 127 F, ♂ ♀.

Pardosa tarsalis,—Simon, 1937, figs. 1648, 1666, 1669, ♂ ♀. Tams-Lyche, 1940: 16, fig. 1, ♀.

Pardosa andersoni Gertsch, 1934: 16–17. Female holotype from Flaxman's Isl., Alaska, in the American Museum of Natural History. Gertsch and Wallace, 1935, fig. 10, ♀.

Pardosa palustris,—Roewer, 1954: 177. Bonnet, 1958: 3402. Wiebes, 1959, figs. 66–67, ♂ ♀. Tongiorgi, 1966, figs. 84–85, 91, 102–103, ♀ ♂.

Description. In this species occur two essentially different carapace patterns. The typical specimens have a pattern similar to that of *P. monticola*. In several specimens the light lateral bands are separated from the carapace margins by a continuous dark band, but specimens can be found in which the outer dark bands are reduced (fig. 91). These specimens have an abdominal pattern like that of *P. monticola*. Figure 16 represents another form of *P. palustris*, often described as a separate species under the name *P. herbigrada* (Blackwall). The two forms, according to Locket and Millidge (1951, p. 261), often exist in the same population, and are interbreeding. The abdomen of *P. palustris* (*herbigrada*) is usually lighter and the sides of the posterior region are clothed with white hairs. Legs

yellow with more or less distinct annulations. Femora with dark blotches dorsally. Terminal apophysis of the male palpus is a broad, slightly curved, more or less sharp and jagged lamina; it is very characteristic and unique to this species (figs. 102, 103). Epigynum as in figures 84, 85. Septum much broader than long, posterior angles obtuse, often prominent and wrinkled. A deep groove extends about two-thirds of the septum's length. Edge of the anterior pockets is characteristic. Color variable: posterior angles generally dark brown-red, but plate usually evenly colored, or only one side darkened. Because of the great variability of the epigynum, I have drawn only two examples. Tambs-Lyche's (1940) series of variant silhouettes of the plate agrees, I find, with the variation in several populations of *P. palustris* collected in the Alps.

Remarks. The peculiar structure of the terminal apophysis of the palpus distinguishes the males of *P. palustris* from those of the other species. The females cannot be mistaken for any other species, as the shape of the epigynum is very characteristic, and though it may vary greatly, it always permits reliable diagnosis. The edge of the anterior pockets has the same structure only in *P. blanda* (and *P. albata*?). The only closely related species is *P. mixta*, which often has posterior angles of the septum similarly wrinkled and prominent, but is distinguished from *P. palustris* by the edges of the anterior pockets and by having the sides of the plate generally more parallel.

Ecology. The species is widespread, especially in cold climates. It lives on mountains as well as plains, mostly in open and rather dry places, meadows, pastures, and heaths (Knülle, 1954: 71; Holm, 1950).

Specimens examined came from Alaska, England, France, Germany, Italy, Austria, Iceland, Denmark, Switzerland. Illustrations were made from Italian and English specimens.

Distribution. Palearctic to Alaska. *Pardosa*

andersoni from Alaska is *P. palustris* (Fox, 1937: 114).

Pardosa consimilis Nosek

Figures 19, 31

Pardosa consimilis Nosek, 1905: 140–141, pl. 5, fig. 18, ♀. Female holotype from Erdschias area (Erdjies), Asia Minor, in the Naturhistorisches Museum, Vienna, examined.—Roewer, 1954: 161. Bonnet, 1958: 3364.

Description. Carapace dark brown. Light median band yellow, oval, scantily branched on the thoracic region, brownish yellow on the cephalic region (Fig. 19). Lateral bands yellow, narrow, continuous, a little sinuous. Near the carapace margin there is a very narrow light band covered with white hairs. White hairs cover the median and lateral bands also. Abdomen yellow-red with the usual pattern of the group. Legs reddish. Femora annulated on upper sides, more or less uniformly darkened on the ventral sides. Tibiae and metatarsi blotched or faintly annulated. Epigynum as in Figure 31.

Remarks. Since I could examine only the holotype of this species I cannot make any comparison with the other species of the *P. monticola* group. Nosek compared this species with *P. blanda* and *P. albata*, but his opinion appears to be incorrect for both the septum and the carapace pattern. However, since the septum is different from that of other species, it is better to consider it as a distinct species.

Pardosa arenicola (O.P.-Cambridge)

Figures 6–7, 18

Lycosa arenicola O.P.-Cambridge, 1875: 253–255, pl. 8, figs. 9a, b, ♀ ♂. Female and male syntypes from Island of Portland, Chesil Beach, England, in the University Museum, Oxford. Smith, 1907, figs. 1a, b, ♀ ♂. Kulezynski, 1909, pl. 22, fig. 10, ♂. Dahl and Dahl, 1927: 52, figs. 136–138, ♀ ♂. Locket and Millidge, 1951: 252–255, figs. 123 A, 124 A, B, ♂ (sub. *L. agrestis* and *L. purbeckensis*; see Wiebes, 1959: 41), 125 A, B, ♂, 127 A, ♂ ♀. Knülle, 1954, pl. 22, fig. 2, ♂.

Pardosa arenicola,—Simon, 1937, figs. 1630, 1671, ♂ ♀. Roewer, 1954: 159. Bonnet, 1958: 3357. Tongiorgi, 1966, figs. 75–76, ♀.

Description. Carapace dark brown. Median light band narrow and anteriorly pointed. Lateral bands broken into three parts by three thin dark lines (Fig. 18). The lateral spots may be well separated or so close as to form a continuous band in what Dahl (1908) called *P. arenicola fucicola*. Legs yellow-brown. Femora with dorsal dark blotches. Sometimes uniformly darkened or inconspicuously annulated. Metatarsi and tibiae with more or less distinct annulations on the tips. Abdomen brown-red. Abdominal pattern not distinct and about the same color as the background. Terminal apophysis of male palpus bicuspid. Tegular apophysis very long and narrow, sharpened at the end (Figs. 6–7). Epigynum as in figures 75, 76. Septum with sides strongly sinuous, very often lobed at the posterior third, about as long as broad, and entire length grooved.

Remarks. The male is easily distinguished by the presence of two teeth on the terminal apophysis. From *P. agricola*, which also has two teeth on the terminal apophysis, *P. arenicola* may be distinguished by the different shape of the tegular apophysis and by the carapace pattern. The females can be distinguished by the carapace pattern. If this is insufficient, e.g., *P. arenicola (fucicola)*, the following characters may be used: unlike *P. agricola* and *torrentum*, *P. arenicola* has the legs slightly or not at all annulated; unlike *P. agrestis*, *P. arenicola* has the lateral sides of the septum strongly sinuous and almost as wide as long; unlike *P. agrestis (pseudomonticola)* Simon and *P. purbeckensis*, *P. arenicola (fucicola)* has the leg color almost uniform and the median and lateral bands often obscure. If all these characters fail, distinguishing among these species may be very difficult.

Lehtinen and Kleemola (1962) and also Locket (1964) doubt the validity of this

species. They consider *P. arenicola* as an ecological form of *P. agricola*.

Ecology. *Pardosa arenicola* lives on sand and pebble beach near the sea. (For further information about the habitat of this species see Knülle, 1954.)

Specimens examined came from England (MCZ) and Germany (coll. and det. by Knülle). Illustrations were made from English specimens.

Distribution. Great Britain, France, Germany, Denmark, Finland, Sweden, Poland, Switzerland, Czechoslovakia, Italy (Di Caporiacco, 1940, 1950). *Pardosa arenicola* does not appear to go south of 48° latitude. The Italian records of Di Caporiacco were based on some specimens found on Cima Galbana (1583 m, Monti Lessini, Veneto) and are therefore very doubtful, and on one female collected on a sand bank of Laguna of Venice.

Pardosa agricola (Thorell)

Lycosa arenaria C. L. Koch, 1834: 123, pls. 15, 16, ♀ ♂. Syntypes from the Danube bank near Regensburg, Germany, probably in the British Museum, London. [Not *L. arenaria* Savigny and Audouin, 1825].

Lycosa agricola Thorell, 1856: 171. New name for *L. arenaria* C. L. Koch. Smith, 1907, pl. 1, figs. 2a, b, ♀ ♂. Dahl and Dahl, 1927: 53, figs. 139–141, ♀ ♂. Kratochvil, 1935: 17, fig. 7, ♂. Holm, 1947: 26, fig. 13c, pl. 5, figs. 50–51, pl. 10, figs. 31–32, ♂ ♀. Locket and Millidge, 1951: 255, figs. 123 B, 124 A, B, ♂ (under the erroneous name of *L. agrestis* and *purbeckensis*), 125 C, D, 127 b, ♂ ♀.

Pardosa agricola,—Simon, 1937, figs. 1631, 1632, 1662, ♂ ♀. Roewer, 1954: 157. Bonnet, 1958: 3348. Tongiorgi, 1966, figs. 77–79, 98, 107–108, ♀ ♂.

Description. Carapace dark brown. Light median band dilated anteriorly, sometimes branched on the thoracic region (fig. 98). On several specimens the median band is not broader than the lateral ones, and on some the anterior enlargement is not clearly evident. Lateral bands clearly broken. Occasionally the posterior spots merge. Ab-

domen very dark with brown-red pattern. Legs yellow, very distinctly annulated. Male palpus with two teeth on the terminal apophysis. Tegular apophysis long and blunt at the end (figs. 107, 108). The female genital plate is about as long as broad. Lateral sides very sinuous. Edge of the anterior pockets as in figures 77-79. (Owing to the great variability, *P. agricola* can often be mistaken for *P. agrestis*, *P. torrentum* or *P. arenicola*.)

Remarks. The male is easily distinguished from the other species by the two-toothed terminal apophysis. The tegular apophysis, clearly blunt at the end, is a good character for separating *P. agricola* from *P. arenicola*, which has a long and tapering apophysis (compare Figs. 6, 7).

The females can be confused with *P. torrentum*, *P. agrestis* (*pseudoagricola* Dahl), and sometimes with *P. arenicola*; however, the carapace pattern distinguishes *P. agricola* from all others. *Pardosa arenicola* has a different carapace pattern (Fig. 18) and much less distinct annulations on the legs.

The genital plate of *P. agrestis* and of *P. torrentum* is broader than long, while that of *P. agricola* is generally as long as broad.

The lateral sides of the septum are very sinuous. The edges of the anterior pockets are useful in distinguishing the species from *P. agrestis*. The abdominal pattern can be used when distinguishing between *P. agricola* and *P. torrentum*: *torrentum* generally has a yellow or yellow-red abdominal pattern, and it is always lighter than *P. agricola*.

A good ecological and taxonomic diagnosis of this species has been given by Lehtinen and Kleemola (1962) for Finnish specimens. They also supplied illustrations of the ventral and dorsal views of the epigynum.

Ecology. According to Dahl and Dahl (1927: 52, 53), and Locket and Millidge (1951: 255), *P. agricola* prefers open, sandy or stony banks of lakes and water courses. It does not seem to reach high altitudes. (See also Knülle, 1954: 73.)

Specimens examined came from Finland, Munkki near Simo (Papi leg.), England (MCZ). Illustrations were made from Finnish and English specimens.

Distribution. Europe, Siberia, Asia, Iran (Roewer, 1955). Roewer (1954: 157) indicates that *P. agricola* is a central and northern European species, but this species has also been found by Roewer (1959) in Greece, Crete, and Anatolia. It is probable that it has often been mistaken for *P. torrentum*. At least *Pardosa agricola* seems more common in northern than in southern Europe.

Pardosa torrentum Simon

Pardosa torrentum Simon, 1876: 313-314, pl. 13, fig. 26, ♀. Male and female syntypes from Lautaret, Briançon, in the Muséum National d'Histoire Naturelle, Paris. Simon, 1937, figs. 1641, 1664, ♂ ♀. Roewer, 1954: 174. Bonnet, 1958: 3426. Tongiorgi, 1966, figs. 86, 87, 99, 109, 110, ♀ ♂.

Lycosa torrentum.—Kulczynski, 1909, pl. 22, fig. 13, ♂. De Lessert, 1910: 507-508.

Description. Carapace dark brown. Some specimens collected on the plain near Pisa and near Barletta, Italy, are lighter yellow-brown (compare Chyzer and Kulczynski, 1897: 297). Median band wide, dilated anteriorly, sometimes branched in the thoracic region (fig. 99). Lateral bands broken into three or four spots, not always as light as the median band, and often very faint in the males. Frequently the two posterior spots blend; sometimes all spots are so close as to form a continuous band (var. *integra* Denis, 1950: 106). Legs yellow-brown. Femora with dorsal brown marks, the other segments (except tarsi) annulated. Annulations always distinct but less so than in *P. agricola*.

Abdomen dark brown, almost black. Anterior median stripe brownish, bordered anteriorly with black, flanked and followed by bright yellow-red pattern. The light spots generally surrounded by a purplish or black area. Femur and patella of male palpus clothed with white hairs. Tegular

and terminal apophyses as in figures 109, 110. Epigynum as in figures 86, 87. Septum broader than long, rarely as broad as long.

Remarks. The male is distinguished from *P. agricola* and *P. agrestis* (*pseudoagricola* Dahl) by the different shape of the terminal apophysis and from all other species by the carapace markings. It is very difficult to separate the females of *P. torrentum* from those of *P. agricola* and *P. agrestis*. The abdominal pattern is lighter in *P. torrentum*, while in both other species the pattern is generally brown-red with little contrast against the background. The legs of *P. agricola* are clearly annulated, less clearly so in *P. torrentum*, and often only slightly annulated in *P. agrestis*.

The septum is usually broader than long in *P. torrentum* and *P. agrestis*, and as long as broad in *P. agricola*. The carapace markings set this species apart from the remaining species of the *monticola* group.

Ecology. This species lives in the mountains as well as on the plains. I found some specimens in Italy in areas near the sea. Denis (1950, 1952, 1955) found specimens several times in the Pyrenees between 1000 m and 2500 m. De Lessert (1910) reported that this species lives in the plains as well as in subalpine regions. It seems to prefer open sandy places with scant vegetation or meadows near streams and rivers.

In Italy this species seems more common than *P. agricola*, that is, without taking into consideration that many citations of this species are probably *P. torrentum*.

Specimens examined came from Italy and Tyrol (MCZ). Illustrations were made from Italian specimens collected near Pisa (Toscana), and Casale Monferrato (Piemonte) (MSNG).

Distribution. France, Switzerland, Tyrol, Italy, Hungary, Pyrenees.

Pardosa agrestis (Westring)

Lycosa agrestis Westring, 1861: 480. Female holotype from Sweden. Bösenberg, 1902, pl. 35,

fig. 547, ♂ ♀. Smith, 1907, pl. 1, fig. 3, ♂. Dahl and Dahl, 1927: 50, figs. 130–132, ♂ ♀. Kratochvil, 1935: 17, fig. 12, ♂. Holm, 1947: 26, fig. 13b, pl. 10, fig. 30, ♂ ♀. Locket and Millidge, 1951: 255–258, figs. 123, 126 A, B, 127 C, ♂ ♀. Knülle, 1954, pl. 22, figs. 4a, b, c, 6, ♂.

Pardosa agrestis,—de Lessert, 1910: 509, figs. 222–224. Simon, 1937, figs. 1628, 1629, 1665, ♂ ♀. Roewer, 1954: 156. Bonnet, 1958: 3346. Tongiorgi, 1966, figs. 72–74, 95–97, 100–101, ♀ ♂.

Description. Carapace dark brown. Median and lateral bands are highly variable, but three principal types are found: one has the median band anteriorly dilated and the lateral bands continuous (fig. 95); another type has the median band anteriorly dilated but the lateral bands broken (*pseudoagricola* Dahl) (fig. 97); the third type has the median band pointed in front and the lateral bands continuous (*pseudomonticola* Simon) (fig. 96). One or another of the three types may be found alone or most frequently in one population (compare Knülle, 1954: 75; de Lessert, 1910: 509, note). Legs light. Annulations more or less clear. The dark marks on dorsal side of femora may reach to ventral side (compare *P. purbeckensis*). Terminal apophysis of male palpus without any projecting tooth (figs. 100, 101). Epigynum highly variable. Septum broader than long. Edge of the anterior pockets generally as in figures 72–74.

Remarks. The lack of projecting teeth on the terminal apophysis makes the males of this species very close to those of *P. purbeckensis*, *P. plumipes*, and *P. incerta*. However, they can be distinguished by the length of the hairs on the legs: longer on the first pair of legs of *P. purbeckensis*, *P. plumipes*, and *P. incerta*, but of the same length on all four pairs in *P. agrestis*. The females are easily distinguished by the carapace pattern when as in figure 95; otherwise they are very hard to identify. *Pardosa agrestis* with the median band anteriorly pointed and continuous lateral bands

is distinguished from *P. blanda* and *P. palustris* by the different shape of the edge of the anterior pockets (compare figs. 84, 85, 88, 89); from *P. mixta* by having the lateral bands a little broader (perhaps) than the median one, and also the epigyna of the two species are different (compare figs. 80, 81). *Pardosa monticola* has the septum at least as long as broad while *Pardosa agrestis* has the septum broader than long (see fig. 83). *Pardosa agrestis* has the lateral sides of the plate less sinuous and has a different ratio of length to width than has *P. arenicola* (compare figs. 75, 76). Differences in annulation of the legs and in the marking of the femora have been found in *P. agrestis*, *P. incerta*, and *P. purbeckensis*. *P. agrestis* and *P. incerta* are much alike. Sometimes *P. agrestis* has a plate much like that of *P. pontica* (compare Fig. 24 and fig. 73). The specimens having the carapace pattern as in figure 97 resemble *P. agricola* and *P. torrentum*. *Pardosa agricola* has the septum about as long as broad with lateral sides generally more sinuous. The legs, moreover, are very distinctly annulated. The lighter abdominal pattern of *P. torrentum* seems to be the best character for distinguishing this species from *P. agrestis*.

Ecology. According to several authors this species lives in the mountains above 2000 m as well as on the plain or near the sea. *Pardosa agrestis* seems to prefer open dry places or fields.

Specimens examined came from France, Austria, England, Italy, Finland, Germany. Illustrations were made from Italian and Finnish specimens, also from French and English specimens (MCZ).

Distribution. Europe, Turkestan, Siberia, Asia. Schenkel (1936: 238) records the presence of *P. agrestis* (1 ♂) in China. He refers to the lateral apophysis of this specimen: "2 kleine dornförmige, divergierende Zähne des Vorderrandes liegen tief in der Laminamulde und sind darum schwer zu sehen." Among the species of the *P. monticola* group that I know, only *P. agricola* and *P. arenicola* have two teeth on the terminal

apophysis. Thus the Schenkel specimens cannot be *P. agrestis*.

Pardosa monticola (Clerck)

Araneus monticola Clerck, 1757: 91, pl. 4, fig. 5, ♂ ♀. Syntypes from Sweden, probably lost.

Lycosa monticola,—Bösenberg, 1902, pl. 35, fig. 549, ♂ ♀. Smith, 1907, pl. 1, figs. 4a, b, pl. 4, fig. A, ♂ ♀. Kulezynski, 1909, pl. 12, fig. 17, ♂. Dahl and Dahl, 1927: 49, figs. 127–129, ♂ ♀. Kratochvil, 1935: 17, fig. 11, ♂. Holm, 1947: 26, fig. 13a, pl. 10, fig. 29, ♂ ♀. Locket and Millidge, 1951: 259, figs. 123 G, 124 C, 126 E, F, 127 E, ♀ ♂. Knülle, 1954, pl. 22, figs. 3a, b, ♂.

Pardosa monticola,—F. P.-Cambridge, 1895, pl. 4, figs. 5, 7c, 8c, 11, ♂ ♀. Simon, 1937, figs. 1658, 1672, ♂ ♀. Wiebes, 1959, figs. 59, 70, ♂ ♀. Roewer, 1954: 167. Bonnet, 1958: 3390. Tongiorgi, 1966, figs. 83, 94, 111, 112, ♀ ♂.

Description. Carapace brown. Median light band pointed anteriorly. Lateral bands continuous and extending to the clypeus (fig. 94). Sides of the head sometimes darkened. Lateral bands slightly broader than the median one. Lateral bands separated from carapace margins by a single dark streak (compare *P. mixta*, fig. 93). Legs light yellow, spotted on upper side, often annulated, especially tibiae and metatarsi three and four. Terminal apophysis with a little tooth (figs. 111, 112), distinctly shorter than in *P. blanda*, *P. albata*, and *P. torrentum*. Tegular apophysis long and rather sharp. Palpus clothed with black hairs only. Epigynum as in figure 83. Septum generally longer than broad (but sometimes as long as broad). Median groove limited to the anterior half. The posterior part of the septum raised slightly in the middle.

Remarks. The male of *P. monticola* is distinguished from those of *P. blanda*, *P. albata*, and *P. torrentum* by the absence of white hairs on the palpus. From *P. torrentum* it also differs by the carapace pattern. From all the other species it differs in the shape of the terminal apophysis. The female of *P. monticola* differs from those

of *P. palustris* and *P. blanda* (and probably *P. albata*) by having the septum at least as long as broad. *Pardosa monticola* differs from *P. mixta* in carapace pattern and by having the posterior angles of the plate less blunt and wrinkled (compare figs 80, 81). It differs very little from *P. purbeckensis* and *P. agrestis* (*pseudomonticola* Simon). It can be distinguished from *P. purbeckensis* by the slightly different shape of the epigynum; specifically, *P. purbeckensis* has the sides of the septum a little more sinuous and the median groove more pronounced. *Pardosa agrestis* has the septum broader than long. From *P. arenicola* (*fucicola* Dahl) it is distinguished by the much smaller size of the septum, and by having the sides of the septum not so sinuous and the median groove not so deep. *Pardosa occidentalis* has a septum resembling that of *P. monticola* but carapace patterns are different. The shape of the plate is useful to distinguish *P. monticola* from the other species.

On Sila Mountain (Calabria, southern Italy) near the shores of Arvo and Cecita lakes (F. Papi, August 1958), and on the slopes of Monte Pollino 1800 m (E. Mayr, May 1957, MCZ), a population of *P. monticola* has been found whose males have the tegular apophysis shorter and not as sharply pointed. Both males and females are slightly smaller. These specimens are probably not *P. monticola minima* Simon (figs. 82, 92, 113, 114).

In my previous paper (Tongiorgi, 1966) a table giving the measurements of twelve female specimens of *P. monticola* from Sila and ten specimens collected in different countries of Europe (Italy, Germany, France, England) are recorded. The drawings of *P. monticola* in Saito (1934, 1959, pl. 5, fig. 30a, pl. 6, fig. 30b) do not agree with this species. It seems to me that the spider represented is too gray and the lateral bands of carapace too broad (about twice the width of the median band). Only a fine broken dark line is visible in the

middle of each band. It is probably *P. plumipes*.

Ecology. This species lives on the mountains as well as on the plains, on the mountain-grassland as well as on dry, open ground heaths near the sea. According to de Lessert (1910: 511) and from my own observations, this species does not seem to reach high elevations in the Alps. Above 2000 m it is replaced by *P. mixta*. (For further information on the ecology of this species see Knülle, 1954, and Wiebes, 1960.)

Specimens examined came from Italy, Germany, Switzerland, France, Ireland, Denmark, England. Illustrations were made from Italian specimens.

Distribution. Europe, Siberia, China, Afghanistan (Roewer, 1960).

Pardosa occidentalis Simon

Figure 28

Pardosa occidentalis Simon, 1881: 135. Female holotype from Portugal, in Muséum National d'Histoire Naturelle, Paris, examined.—Roewer, 1954: 169. Bonnet, 1958: 3398.

Description. Carapace brown with median and lateral bands yellow. Median band slightly broadened anteriorly and at level of the thoracic furrow where it is slightly branched. The two wide areas are about the same width. Lateral bands are continuous, as wide as the median one, serrated on the upper margin, and continuous on clypeus. There is a narrow dark band, barely evident, near the carapace margins. Legs yellow. Femora with dorsal blotches. Epigynum as in Figure 28.

Remarks. The only specimen known of this species is the holotype, here illustrated. It is impossible to judge whether it is a good species or not. Judging by the shape of the epigynum, *P. occidentalis* is closely related to *P. monticola* but the carapace pattern is different. The shape of the epigynum and absence of leg annulations distinguish it from *P. agrestis*.

Pardosa blanda (C.L. Koch)

Figure 27

Lycosa blanda C. L. Koch, 1833: Heft 120, pl. 24, ♂. Male holotype and female paratype from near Nassfelde, Salzburg, Austria, probably in British Museum, London. Kulezynski, 1909, pl. 22, fig. 12, ♂. Kratochvil, 1935: 17, fig. 8, ♂. Dahl and Dahl, 1927: 51, figs. 133-135, ♂ ♀.

Pardosa cursoria.—Simon, 1876: 316-318.

Pardosa blanda.—Simon 1937, figs. 1647, 1670, ♂ ♀. Roewer, 1954: 160. Bonnet, 1958: 3360. Tongiorgi, 1966, figs. 88-90, 115, 116, ♀ ♂.

? *Pardosa subalpina* Schenkel, 1918: 97. Female holotype from Klein Scheidegg bei Wengen, Berner Oberland, Switzerland, in the Naturhistorischen Museum of Basel, examined.

Description. Carapace dark brown. Median light band narrow, spindle-shaped, sometimes a little enlarged at the anterior end and at the level of the median furrow. Here occasionally faintly branched. Median band clothed with white pubescence. A narrow line made up of light pubescence may continue between the posterior median eyes. Lateral bands yellow. Often two very thin dark lines divide each band into three light spots (fig. 90). Lateral bands about as broad as the median one. Between the lateral band and the carapace margin there is a dark brown band narrower than the light one. The lateral bands do not continue forward on the clypeus but stop on the sides of the head.

Abdomen with reddish pattern on almost black background. Ventral side thickly clothed with white pubescence. Legs dark. Femora uniform or with dark brown spots on dorsal side. Tibiae and metatarsi annulated especially on the posterior legs. Distal end of femur and patella of male palpus clothed with white hairs. Terminal apophysis forms a strong tooth as in figures 115, 116. Septum broader than long, not greatly variable in shape. Edge of the anterior pockets as in figures 88, 89.

Remarks. The male is very close to *P. albata*, *P. pontica*, *P. monticola*, and *P. torrentum*, especially in the terminal apophysis of the palpus. It is distinguished from *P.*

monticola by the larger terminal apophysis and the thicker tegular apophysis. Further, *P. monticola* does not have white hairs on the palpus. *Pardosa albata* and *P. pontica* have the palpus entirely clothed with white hairs. *Pardosa torrentum* has a different carapace pattern. The females are distinguished from those of *P. monticola* and *P. mixta* by the edge of the anterior pockets (compare figs. 80, 81). *Pardosa blanda* is distinguished from *P. purbeckensis* by having the septum clearly broader than long (*P. purbeckensis* has the plate almost as broad as long), and by the darker legs. It is distinguished from *P. palustris* by the shape of the septum. *Pardosa blanda* is easily distinguished from all other species by the epigynum and the carapace pattern. It may sometimes be difficult to separate *P. blanda* from *P. agrestis* (*pseudomonticola* Simon). The latter has the lateral bands continuous around the head while in *P. blanda* these are often broken off anteriorly on the sides of the head.

I have not been able to examine any female specimens of *P. albata*. Kratochvil (1935) pointed out lighter coloring of the legs and greater length of patella and fourth tibia compared to fourth metatarsus. These characters cannot be used to distinguish *P. blanda* and *P. albata*. I have often found considerable variation in color and length of the leg segments.

Note. Only the female holotype of *Pardosa subalpina* is known. Schenkel described the specimen, and gave it a new name, though in doubt. The general features, the carapace, and abdominal pattern are like *P. blanda*. The epigynum is very different. It is difficult to establish whether this specimen is an abnormal, teratological one of *P. blanda* or actually belongs to a different species. It is my opinion that *P. subalpina* must be considered an anomalous specimen of *P. blanda*. As it is impossible to draw a conclusion from only one specimen, I limit myself to an illustration (Fig. 27).

Ecology. *Pardosa blanda* lives in mountains between 1000 m and 3000 m, but most

frequently at about 2000 m. *P. albata* also reaches these elevations. As far as I know, the southernmost point recorded for this species is Varco del Monte Pollino (about 2000 m) in the south of Italy (Simon, 1882).

Specimens examined came from Italy (Alps and Appennines), Switzerland, Yugoslavia, and Austria. Illustrations were made from Italian specimens.

Distribution. France, Germany, Switzerland, Italy, Czechoslovakia, Austria, Poland, Hungary.

Pardosa albata (L. Koch)

Lycosa albata L. Koch, 1870: 36–38. Female and male syntypes from the Tatra Mts. and Bucovina, Carpathian Mts., probably in the Berlin Museum.—Kratohvil, 1935: 17, fig. 9, ♂.

L. albatula Roewer, 1951: 438. New name for *P. albata* thought preoccupied by *Tarentula albata* Nicolet.

Pardosops albatula Roewer, 1954: 196.

Pardosa albata,—Bonnet, 1958: 3350. Tongiorgi, 1966, figs. 117, 118, ♂.

Description. I could examine only two specimens of this species in the collection of spiders from Carnia studied by Di Caporiacco (1922, 1927), and preserved at the Museum of Natural History of Florence. The only differences from *P. blanda* are that the palpus is covered with white pubescence from the base of the femur to about the middle of the tarsus, and that the tegular apophysis (figs. 117, 118) has a slightly different shape.

For the females, the only drawings I was able to find (Chyzer and Kulczynski, 1891, pl. 2, fig. 10a, b; Bösenberg, 1902, pl. 35, fig. 550; Kolosvary, 1937: 404, fig. 1) did not portray any difference from *P. blanda*, and the description by Koch and the distinctive characters from *P. blanda* (*L. cursoria* in Koch, 1870: 42) are not sufficient to separate the females of these two species. Two females borrowed from Dr. Balogh (University of Budapest) determined by Chyzer (Chyzer Coll. no. 1187) as *P. albata* seem to be identical with *P.*

blanda. *Pardosa pontica* is closely related to *P. albata* but does not have white hairs on the tarsus of the male palpus (compare *P. pontica* Figs. 10, 11 and page 352).

Roewer includes *P. albata* (= *L. albatula* Roewer, 1951) among the species of his new genus *Pardosops* (Roewer, 1954: 196), based chiefly on the presence of two teeth on the posterior edge of the chelicerae (Roewer, 1958: 18, 150). I think the character is not acceptable. I found my specimens have three teeth on the posterior edge of the chelicerae and variation in the number of teeth occurs in other species of this genus (i.e. *P. morosa* L. Koch). Besides, I see no reason to split up this very homogeneous group by assigning species to an artificial genus.

Ecology. This species has been found in mountains.

Distribution. Germany, Hungary, Poland, Russia, Siberia, Italy, Carpathians, Balkans, Transylvania.

Pardosa pontica (Thorell)

Figures 10, 11, 24

Lycosa pontica Thorell, 1875: 100. Male lectotype here designated and one female paralectotype from Alma, Bajnklanbatt, Sympheropolin, southern Russia, in the Zoological Museum, Helsinki, examined.

Pardosops pontica,—Roewer, 1954: 197.

Pardosa pontica,—Bonnet, 1958: 3407.

Note. Thorell (1875: 143) writes that he examined two females of this species. Actually one of the two females determined by Thorell does not belong to the *P. monticola* group, but to a species closely related to *Pardosa saltuaria* (L. Koch).

Description. Carapace brown. Light median band spindle-shaped. Lateral bands yellow, continuous. Each lateral band includes near the margins of carapace a dark band. The carapace as well as the rest of the body is covered with white hairs. Clypeus yellow. Legs of the female have blotches on upper sides of femur. Tibiae and metatarsi with very pale annulations. The male has femora blotched only on

upper sides; other segments uniform. Numerous white hairs make the legs of alcoholic specimens appear pale yellow-white. Male palpal segments yellow with brown blotches on femora (Figs. 10, 11). White hairs on all segments except tarsus. Epigynum as in Figure 24.

Remarks. The male of *P. pontica* is distinguished from that of *P. albata* by the lack of white hairs on the palpal tarsus, and by the slightly different pattern on the carapace. I did not see any females of *P. albata*, thus do not know how the two species differ. The female of *P. pontica* is similar to that of *P. agrestis*, at least in the shape of the epigynum (Fig. 24). Illustrations were made from the lectotype and paratype. Concerning the inclusion of *P. pontica* in the genus *Pardosops* (Roewer, 1954), see the comments above under the preceding species *P. albata*.

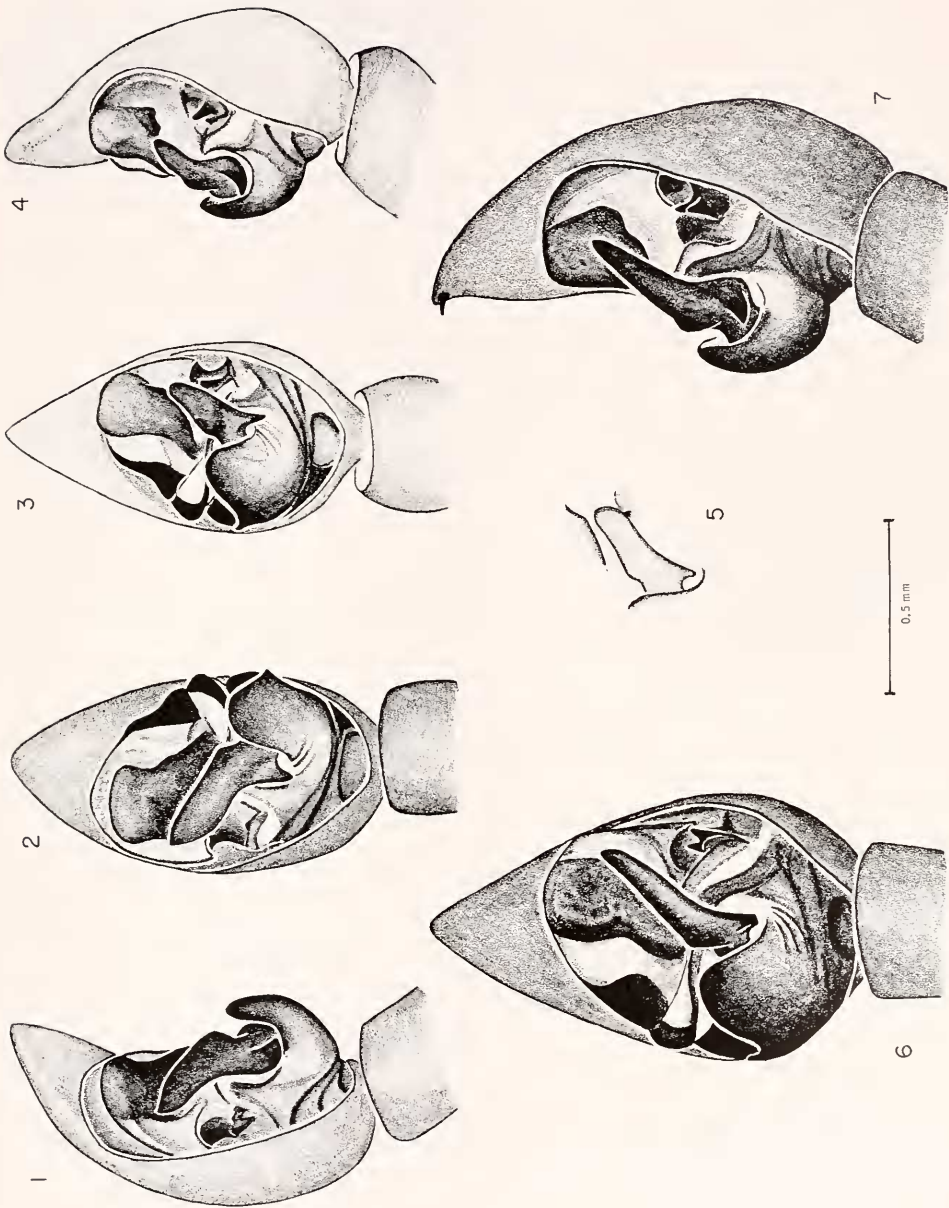
Distribution. Southern Russia: Cherson Taurica; Alman, Bujuk-Lambat, Sympheropolin, Balkan. I could not consult the work of Drensky (1936) but he could have mistaken *P. pontica* for *P. albata*. This species seems common in the Balkan region.

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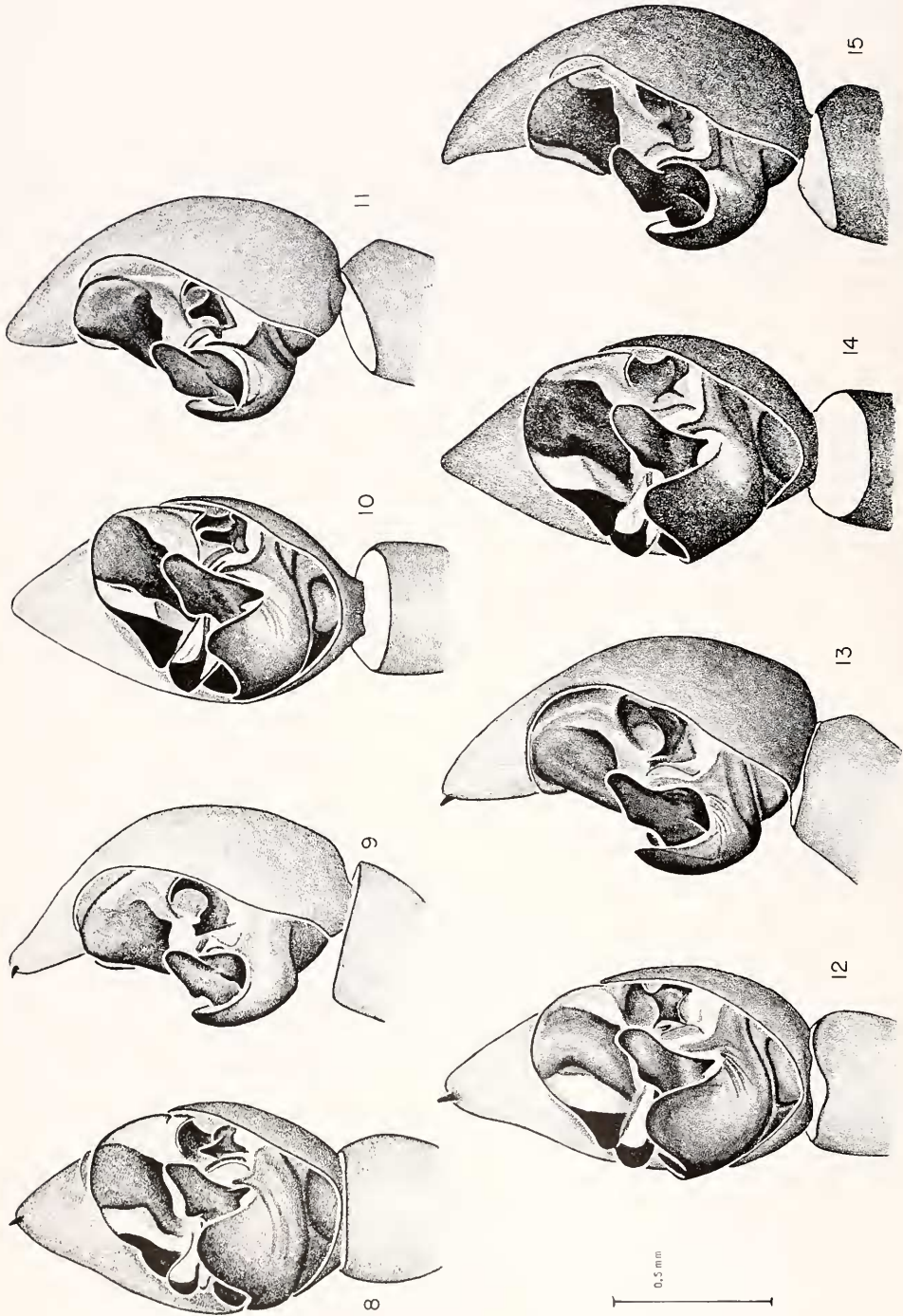
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Figs. 1-7. Male palpi. Figs. 1-2. *Pardosa incerta* Nosek, right palp. 1. Lateral view, 2. Ventral view. Figs. 3-5. *P. ilguenensis* Nosek, left palp. 3. Ventral view, 4. Lateral view, 5. Tegular apophysis of paratype. Figs. 6-7. *P. arenicola* (O.P.-Cambridge), left palp. 6. Ventral view, 7. Lateral view.



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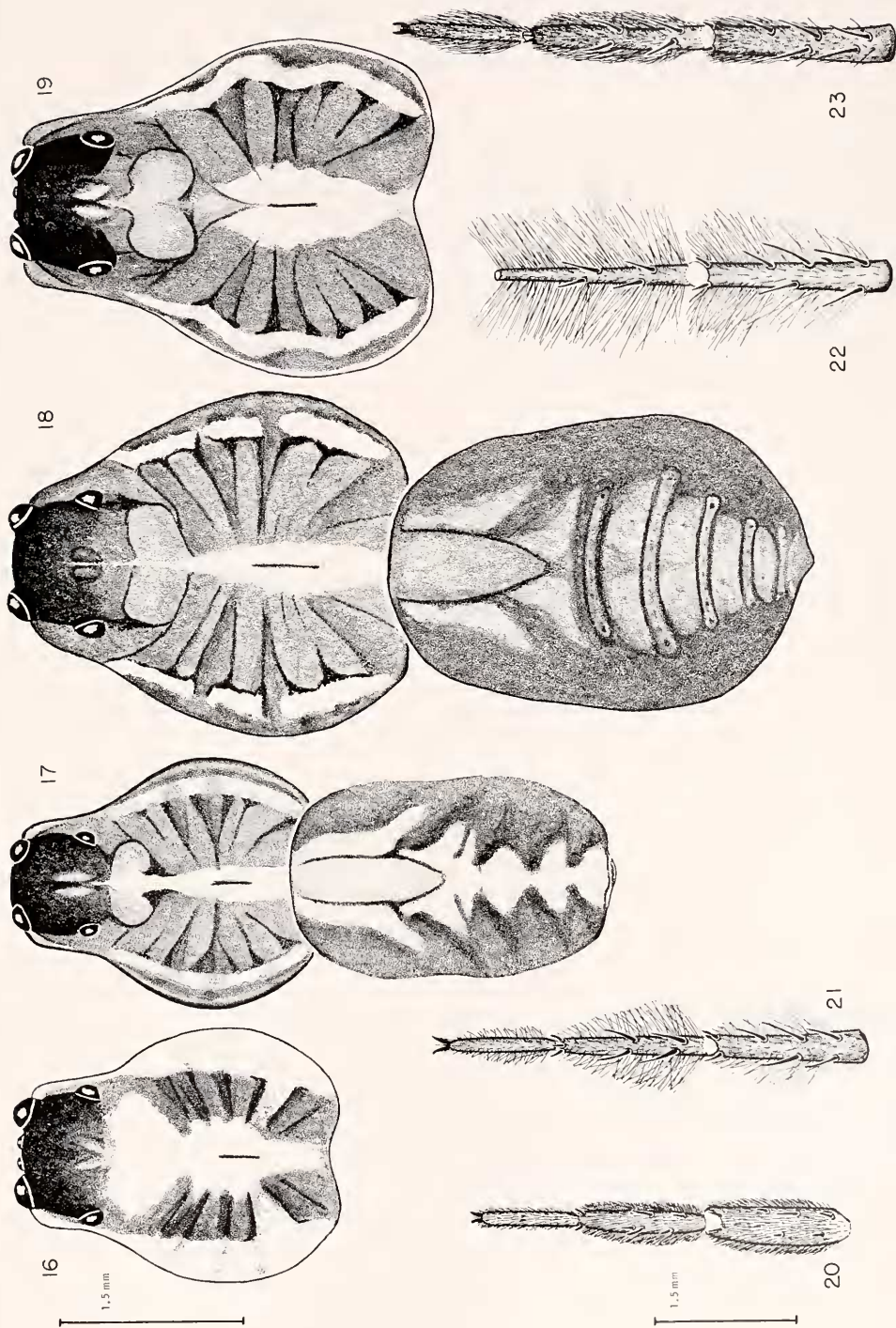
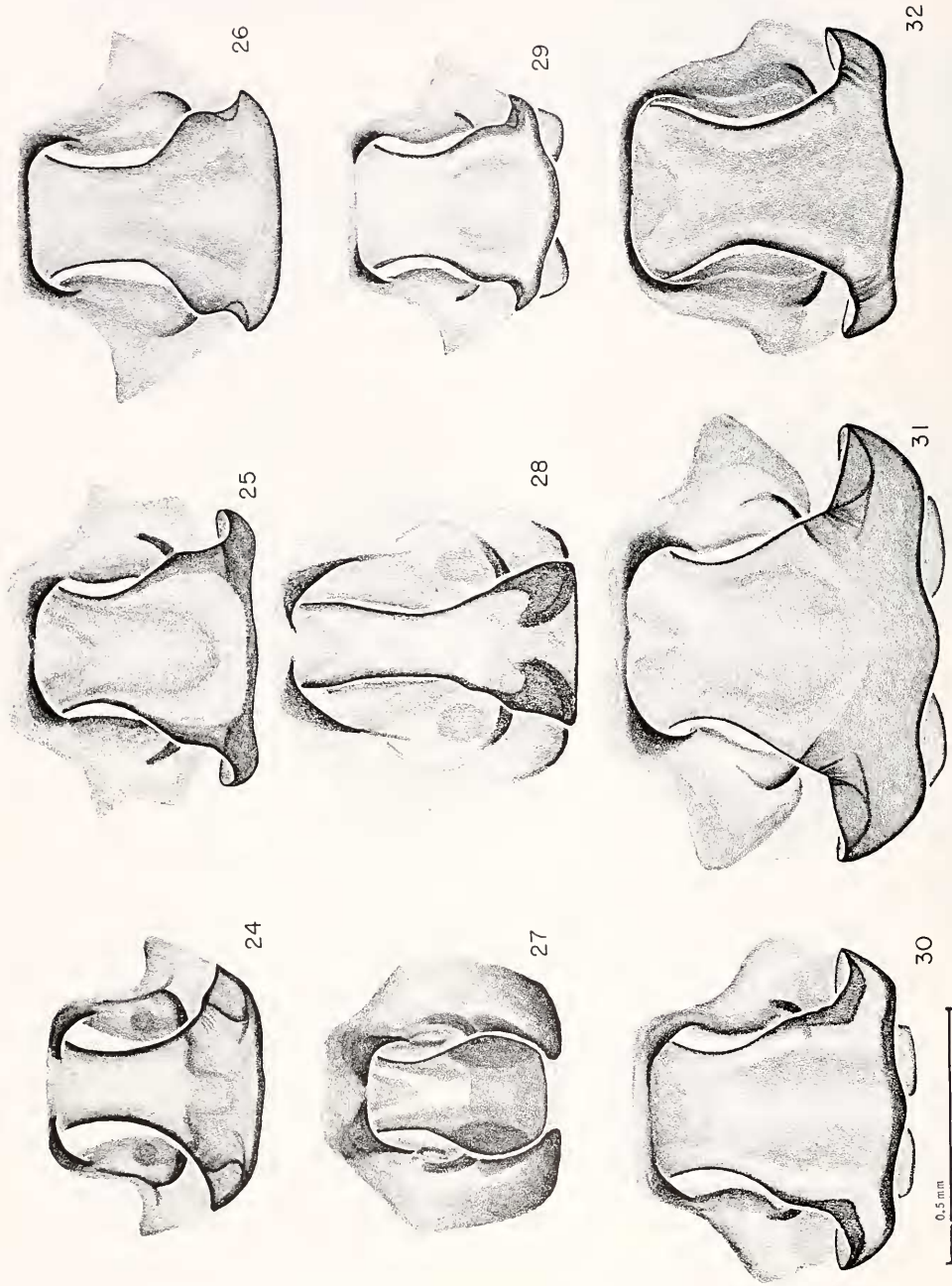


Fig. 16. *Pardosa polustris* (Linn.) female carapace. Fig. 17. *P. olympica* sp. n., female, dorsal view. Fig. 18. *P. arenicola* (O.P.-Cambridge), female, dorsal view. Fig. 19. *P. consimilis* Nosek, female carapace. Fig. 20. *P. ilguenensis* Nosek, venter of first leg. Fig. 21. *P. purbeckensis* F.P.-Cambridge, venter of first leg. Fig. 22. *P. plumipes* (Thorell), venter of first leg. Fig. 23. *P. mixta* (Kulczyński), venter of first leg.



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